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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,546	11/03/2003	Naokatsu Ikegami	OKI.153DC	9945
20987	7590	03/24/2006	EXAMINER	
VOLENTINE FRANCOS, & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190			CHEN, KIN CHAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/698,546

Applicant(s)

IKEGAMI, NAOKATSU

Examiner

Kin-Chan Chen

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. Claims 12-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claims 12 and 14, " the absence of fluorine " is new matter.

***Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Ex parte Parks, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993). The mere absence of a positive recitation is not basis for an exclusion. Specification must clearly set forth an explicit definition. Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d985, 989 (Fed.Cir. 1999).***

Applicant pointed out the description of the third embodiment. The examiner notes that the third embodiment recites using a mixed gas of O<sub>2</sub> + N<sub>2</sub>H<sub>2</sub> for the plasma treatment. The examiner considers that it is open-ended and does not exclude additional, unrecited elements or method steps. See *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003), see also MPEP 2111.03.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The examiner notes that the third embodiment recites using a mixed gas of O<sub>2</sub> + N<sub>2</sub>H<sub>2</sub> for the plasma treatment. The examiner considers that it is open-ended and does not exclude additional, unrecited elements or method steps.

3. Claims 12-17 are rejected under 35 U.S.C. 103(a) as obvious over Watatani (US 6,153,511) in view of Huffman et al. (US 6,082,374; hereinafter "Huffman") or Xu et al. (US 5,908,319; hereinafter "Xu") as evidenced by Sugahara et al. (US 5,989,998).

In a method for fabricating a semiconductor device, Watatani teaches that an organic insulating layer (e.g., organic SOG) may be formed over an interconnect layer. A contact hole may be formed in an organic insulating layer (e.g., organic SOG) so as to expose the interconnect layer using a patterned resist layer formed over the organic insulating layer as a mask. The patterned resist layer may be ashed (Figs. 5A-5I; col. 7, lines 7-11). Watatani teaches removing photoresist by ashing. Watatani is not particular about the etchant. In a method for stripping photoresist, Huffman (col. 4, lines 10-12, 56-60; col. 5, lines 60-66 and examples 1, 2, 6-8) or Xu (col. 2, lines 46-60) teaches that

oxygen and a mixed gas containing nitrogen and hydrogen (such as  $N_2H_2$ ) may be used for ashing to strip the photoresist from the substrate. Since the substrate typically refers to any well-known semiconductor structures including insulating layers or conductive layers, therefore, making organic SOG insulating layer obvious. Hence, it would have been obvious to one with ordinary skill in the art to use oxygen and a mixed gas containing nitrogen and hydrogen (such as  $N_2H_2$ ) as taught by Huffman or Xu in the process of Watatani for ashing in order to increase the efficiency and effectiveness.

The claimed invention differs from the combined prior art by specifying forming a protective film on a surface of the contact hole during the ashing wherein the protective film is formed by reacting the organic insulating layer (e.g., organic SOG) with the nitrogen. However, because the same materials are used with the same process, it is expected that the method of the combined prior art would possess the claimed characteristic and properties, such as forming the protective by reacting the organic insulating layer with the nitrogen.

Claim 15 differ from the prior art by specifying conventional materials and process (such as forming organic SOG by adding alkyl group to a silicon oxide) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding any of same conventional materials and process to same in order to form the organic SOG with a reasonable expectation of success, see Sugahara et al. (US 5,989,998) in the record as evidence.

### ***Response to Arguments***

4. Applicant's arguments filed February 8, 2006 have been fully considered but they are not persuasive.

Applicant has argued that prior art does not teach "the absence of fluorine". It is not persuasive. As has been stated in the office action, the examiner notes that the third embodiment recites using a mixed gas of  $O_2 + N_2H_2$  for the plasma treatment. The examiner considers that it is open-ended and does not exclude additional, unrecited elements or method steps. See *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003), see also MPEP 2111.03.

***The mere absence of a positive recitation is not basis for an exclusion. Specification must clearly set forth an explicit definition. Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d985, 989 (Fed.Cir. 1999).***

### ***Conclusion***

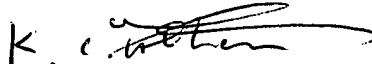
5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sugahara et al. (US 5,989,998; col. 3, lines 25-42) discloses that organic SOG may be formed by adding alkyl group to a silicon oxide.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

March 20, 2006

  
Kin-Chan Chen  
Primary Examiner  
Art Unit 1765